throughout with cavities and many pleural adhesions. Left lung clear except for a few calcified glands at hilus.

On June 8, 1920, operation under local anaesthesia, a parasternal incision was made on right side. Extrapleural resection of parts of first to fifth ribs inclusive, closure of muscles and skin. No drainage. Patient made an uneventful recovery, leaving hospital in two weeks. Her general health gradually improved. Sputum decreased and temperature curve improved. Pressure bandage applied.

On September 2, 1920, she was referred back again by Dr. Kalb for the second stage of operation. The roentgenogram showed considerable collapse of the lung but not sufficient to obliterate the cavities. She was not coughing as much and the temperature had been considerably lower since the first stage of the operation. There was practically no respiratory movement of the right chest and no bony union at points of resection. Being quite apprehensive about the operation, a combination of morphine, procain and gas oxygen anaesthesia was used. A paravertebral incision exposing angles of fifth to eleventh ribs being made, sections varying from two to four inches were removed in each instance, always including the angle without continuation. the angle, without opening the pleural cavity.

She left the hospital in a week and made a good recovery and, excepting a slight infection of lower end of incision and some neuralgia in shoulder, had no post-operative complications.

In a letter dated November 24, 1920, she says: "My temperature is seldom above 99° these days, sometimes normal all day.

Her recovery has progressed satisfactorily up to the present time and the outlook is good.

#### Summary

- The extrapleural rig resection under local anaes-thesia is a comparatively safe operation.
- The patient with large cavities and toxic conditions from pus absorption, still has a chance even if arti-ficial pneumothorax has failed.
- The proper selection of cases for operation is more importance than anything else careful study.
- In some instances it is better to divide the operation into more than one stage.
- 5. Extrapleural resection of the angles of offers the best means of collapsing the lung. of the ribs

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# URINARY PUS CELL COUNT \*

By LEON J. ROTH, M. D., F. A. C. S., Los Angeles

Routine laboratory reports concerning pyuria are often fallacious and the interpretations of them frequently lead to wrong opinions, not only from a viewpoint of diagnosis or prognosis, but in segregating cases that either are or are not worthy of serious study.

In the urine the importance of a small amount of pus originating from the glands or mucus membranes of the lower urinary segment or from the genitalia may be nil, yet upon centrifuging such a specimen many corpuscles will be demonstrated that may wrongly stimulate the notion of severe infection. Such interpretations are further induced because the urine submitted for examination has not been properly collected and inspected.

Gross infections are quite apparent and usually the microscopic search for pus cells is negligible, but the finer infections, such as pyelitis, pyelonephritis, obscure prostatitis and vesiculitis, and the remote urinary infections of children and young adults, are problems the course of which becomes more complicated and result of treatment more uncertain without absolute microscopical control of the actual number of white corpuscles.

A characteristic of renal pyuria is that the exhibition of cells is consistent and constant. Urinary pus may be decreased somewhat by rest, and increased by exercise, cold, and alcohol, but with unusual exception, infection once chronically established is continuous and the variation in intensity of this is slight.

A drop of pus in a centrifuged specimen of 100 mils or ten drops in a like volume will, in a pipetted deposit on a slide, show the same number of cells. The microscopic examination of 1 mil or 10 mils of pus in concentration will furnish such crowded fields that they cannot be told apart. The amount of pus produced by a urethral shred collected by pipette from the bottom of a centrifuge tube will, by comparison, show as many cells under a cover glass as a like quantity of pure pus similarly obtained.

Because of the consistent quality of a given specimen of urine 1 c.mm. taken from 10 mils or 100 mils will give the same number of cells.

Until recently we have been counting a definite number of fields and making our estimate on the average number of cells per field in uncentrifuged specimen. This is not a precise method, as cover glass pressure and fluid dispersion cannot be controlled.

Therefore, as a means of more or less accurate diagnostic and prognostic aid, the following method has been adopted. The technique is both rapid and simple, and the count is made without centrifuging.

The fresh specimen of urine is thoroughly shaken and a portion drawn into a red blood cell pipette. This pipette is chosen because it facilitates a final agitation of the fluid. A Thoma Zeiss counting chamber is then filled with the fluid in the method used for counting blood cells. The eyepiece of

<sup>\*</sup>Read before the Fiftieth Annual Meeting of the fedical Society of the State of California, Coronado, Medical S May, 1921.

the microscope is adjusted so that the diameter of the field is eight small squares. One hundred fields are then counted, disregarding the ruling of the counting chamber. The resulting number multiplied by .7957728 will give the number of pus cells in 1 c.mm.

The factor .7957728 is found by the following

The field is eight squares in diameter. The radius expressed in mm. is .2 mm. The area of one field is Pi r<sup>2</sup> or 3.1416 x .04 equals .125664. The depth of the chamber is .1 mm.; therefore, the volume of one field counted is .125664 x .1 equals .0125664. If .0125664 equals the volume of 1 field, 100 fields equal 100 x .0125664 or 1.25664. 1.25664 is greater than 1 c.mm., 1 c.mm. divided by 1.25664 equals .7957728 or the factor with which to multiply to obtain the number of cells in 1 c.mm.

The following figures have been chosen, arbitrarily, to designate the degree of pyuria:

	0. 2 to 3. 4 to 6. 6 to 8. 9 or more.	
•	0. 1. 4 to 9 or	
	Por field 0. " 2. " 4. " 4.	
	Per	
	o plus	
	No pus cells0         Very few	
	per c.mm.	
	0 pe 0-100 100-300 300-500 500-700	

The variation of specific gravity has no great influence upon computations, but we have adopted 1000 as a standard and the formula expressed as

The known specific gravity is to 1000 as the number of pus cells in 1 c.mm. is to x.

e.g., 1020:1000::102:x.

As a control in the count following prostatic massage the bladder is thoroughly irrigated and finally filled with 100 cc. of mild antiseptic solution. This is voided after massage and the count made using this 100 cc. as a standard quantity. The estimate here, as elsewhere, is relative.

It is desired to convey the suggestion that in making plural counts the physical character and quantity of the urines should be closely similar.

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#### TREATMENT OF GOITRE

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When we review the history of goitre, we find that for many years it was regarded as a disease to be treated by medicine alone. It was largely the work of Kocher that made the surgical treatment so successful. Year by year, with increasing experience, and technical skill, surgeons have lowered the mortality rate and have taught the profession, as well as the laity, the need for early operation if irreparable damage is to be avoided. The development of X-ray and Radium therapy has opened up new fields in the treatment of many diseases, and it is not surprising that the goitre problem has received its share of attention. The pendulum has swung from medicine to surgery and now seems to be swinging towards radio-therapy. Much of the treatment is done, unfortunately, in a perfunctory manner, without sufficient thought and care, without proper choice of cases, and without a knowledge of those general principles which are so essential to the intelligent choice of therapeutic methods.

It would seem that a word of warning is particularly needed at this time when this form of treatment is so often carried on by physicians, or even technicians, who have had little or no experience in the treatment of goitre, or even with general radiotherapy.

Our whole system of modern medicine is based upon correct diagnosis. When a diagnosis of thyroid disease has been made only the first step has been taken towards establishing a rational basis for treatment. It is just as necessary to recognize clearly the various forms of thyroid enlargement as it is to distinguish one type of intestinal parasite from another, or to differentiate empyema from pneumonia.

The clinician and the pathologist do not entirely agree upon the classification of goitre, as the pathological picture is not always in accord with the clinical findings. However for practical purposes the following classification meets all requirements.

# COITRE

Atoxic (1) Simple hypertrophy, adolescent goitre

Colloid, calcified or cystic

Simple adenoma Toxic adenoma

Toxic (1)

(2) Hyperplastic (exophthalmic)

Carcinoma. Malignant

Sarcoma, etc. (2)

In well developed cases it is usually easy to classify goitre into these groups, but there are many border-line cases giving rise to mild signs and symptoms in which an accurate estimate of the glandular function is essential. It is not only necessary to know that an increased or decreased function exists but also the degree of that changed function. This is often impossible clinically, for a large goitre may actually be deficient in thyroid secretion, while a barely noticeable gland will produce an extreme degree of hyperthyroidism. The thyroid secretion now appears to be the principal regulator governing metabolic processes in the body. By determining